

**REMARKS**

The Office Action of April 11, 2011 has been carefully reviewed. The Applicants respectfully request the Examiner to reconsider the rejections and allow the pending claims in view of the following remarks.

Claims 1-5, 7-27, and 34-39 are pending. Claims 6, 11-26, and 28-33 are canceled. Claims 27 and 34-39 are withdrawn from consideration. The specification and claim 1 are objected to for informalities. Claims 1-5 and 7-10 stand rejected. Claims 1 and 7 are hereby amended.

***Specification***

In the Office Action dated March 11, 2011, the Examiner objected to the disclosure for informalities. The Examiner specifically stated "the use of 'welt' through out the disclosure maybe a typographical error and was intended to recite 'weft'." The specification has been amended to overcome the objections. The amendments to the claims are typographical in nature and no new matter has been added by way of amendment. Applicants respectfully request withdrawal of the objection.

***Claim Objections***

In the Office Action mailed March 11, 2011, the Examiner objected to claim 1 because of informalities. Claim 1 has been amended to overcome the Examiner's objection. Applicants respectfully request withdrawal of the objection.

***Claim Rejections – 35 U.S.C. § 112***

In the Office Action mailed April 11, 2011, the Examiner rejected claims 1-5 and 7-10 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claims 1 and 7 have been amended to overcome the rejections. Applicants respectfully request withdrawal of the rejections.

***Claim Rejections – 35 U.S.C. § 103***

In the Office Action mailed April 11, 2011, the Examiner rejected claims 1, 5, 7, and 10 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,294,394 issued to Sakai et al. on March 15, 1994 (hereinafter referred to as “Sakai”) in view of U.S. Patent Publication No. 2002/0009935 A1 issued to Hsiao on January 24, 2002 (hereinafter referred to as “Hsiao”). In addition, the Examiner rejected claims 2 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Sakai in view of Hsiao and in further view of U.S. Patent Publication No. 2003/0161989 A1 issued to Funakoshi on August 28, 2002 (hereinafter referred to as “Funakoshi”). In addition, the Examiner rejected claims 3 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Sakai in view of Hsiao and in further view of U.S. Patent No. 6,749,934 issued to Nagayama on June 15, 2004 (hereinafter referred to as “Nagayama”). In addition, the Examiner rejected claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Sakai in view of Hsiao and in further view of EP Patent No. 0945253 A2 issued to Bassett et al. on September 29, 1999 (hereinafter referred to as Bassett”). Claims 2-5 and 7-10 depend from independent claim 1 and, as such, stand or fall on the application of the combination of Sakai and Hsiao to independent claim 1. For the reasons that follow, Applicants

respectfully submit that claim 1 and the claims depending therefrom are not obvious in view of the cited prior art.

Independent claim 1 reads:

1. A thermoplastic composite sheet comprising:
  - a center layer prepared by melt-extruding a thermoplastic composite material containing thermoplastic resin; and
  - a continuous reinforcing fiber-impregnated prepreg layer laminated on at least one whole surface of an upper surface and lower surface of the center layer, the prepreg layer comprising 5-65% by weight of reinforcing fibers and 35-95% by weight of thermoplastic resin;
  - wherein the continuous reinforcing fiber-impregnated prepreg layer comprises a plurality of tapes or strands that have been aligned to form wefts and warps, and
  - wherein each of the plurality of tapes or strands have been impregnated with the thermoplastic resin of the continuous reinforcing fiber-impregnated prepreg layer prior to being aligned; and
  - the center layer of thermoplastic composite material is a foaming layer or a glass fiber-reinforced thermoplastic resin layer.

*See supra.* As shown above, independent claim 1 recites the element that ***each of the plurality of tapes or strands have been impregnated with the thermoplastic resin of the continuous reinforcing fiber-impregnated prepreg layer prior to being aligned.***

To the contrary, as noted by the Office Action, neither Sakai nor Hsiao contains this element. See Office Action at 7. Despite the fact that this element is absent from the cited prior art, the Office Action asserts the obviousness of claim 1, noting:

[a]lthough Sakai and Hsiao do not disclose “tapes or strands have been impregnated with a thermoplastic resin prior to being aligned,” it is noted that “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process.” Further, “although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product.”

See Office Action at 7 (citations omitted) (emphasis added). That is, the Office Action bases the conclusion of obviousness on the assertion that the thermoplastic composite sheet of claim 1 is "the same as or obvious from a product of the prior art," and, as such, is obvious in view of the cited from art.

First, Applicants respectfully submit that, contrary to the assertion of the Office Action, the thermoplastic composite sheet of claim 1 **is not** "the same as or obvious from a product of the prior art," and, as such, the combination of Sakai and Hsiao cannot render obvious independent claim 1 or the claims depending therefrom. Referring to the Declaration Under 37 C.F.R. § 1.132 of Inventor San Jun Youn (hereinafter referred to as the "San Jun Youn Declaration"), as noted by the Inventor:

**[t]he prepreg layers of Sakai and Hsiao were prepared by impregnating the thermoplastic resin after a glass fiber mat was prepared. The glass fiber mat is already prepared before the impregnating of the thermoplastic resin, so the thermoplastic resin could not be impregnated into the glass fiber mat.** This is also observed in SEM images in the above Table 1. However, the prepreg layer of the present invention was prepared by **each of the plurality of tapes or strands of the prepreg layer that have been impregnated with a thermoplastic resin prior to being aligned. By this method, the resin is able to be fully impregnated into the fiber,** and this is also observed in SEM images in the above Table 1.

See San Jun Youn Declaration at page 6, item 5.1 (emphasis added). As noted by the Inventor, in the methods of Sakai and Hsiao, because the glass fiber mat is prepared prior to impregnation with the thermoplastic resin, the thermoplastic resin is unable to fully impregnate the glass fiber mat, as is demonstrated by the SEM images shown of Table 1. See generally, San Jun Youn Declaration at pages 5-6. Conversely, in the method by which the thermoplastic composite sheet of claim 1 is prepared, because each of the plurality of tapes or strands of the prepreg layer is impregnated with a thermoplastic resin prior to being aligned, the resin is able to fully impregnate the fibers, as is also

demonstrated by the SEM images of Table 1. See San Jun Youn Declaration at pages 5-6. That is, even though the difference may occur at a level that is unobservable by the naked eye, the San Jun Youn Declaration nonetheless demonstrates that the thermoplastic composite sheet of claim 1 ***is not*** “the same as or obvious from a product of the prior art.” As such, the combination of Sakai and Hsiao cannot render obvious independent claim 1.

Second, even if, *arguendo*, the thermoplastic composite sheet of claim 1 is not “the same as or obvious from a product of the prior art,” Applicants respectfully submit that secondary considerations demonstrate the nonobviousness of independent claim 1 and the claims depending therefrom. Particularly, Applicants submit that the claimed subject matter exhibits unexpected, beneficial results. As noted by the Federal Circuit, a showing of unexpected results may rebut a *prima facie* case of obviousness. See e.g., *In re Soni*, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995). As noted by the Inventor:

[t]he impregnation of the thermoplastic resin into the glass fiber **has a strong influence on the mechanical properties of the prepreg layer.** According to the above Table 2, it is shown that **the prepreg layer of the present invention has a superior effect to those of Sakai and Hsiao.**

See San Jun Youn Declaration at page 6, item 5.2 (emphasis added). As such, the Inventor demonstrates the beneficial results. Further, the Inventor continues:

[f]rom the fact that the glass fiber contents and density of the prepreg layer of the present invention are the same as those of Sakai and Hsiao, **I believe that the superior effect is the result of the differences in the preparation process.** Therefore, I believe that a non-obvious difference between the claimed product and Sakai/Hsiao is proved, and thus the present invention has an inventive step over Sakai and Hsiao.

See San Jun Youn Declaration at page 6, item 5.3 (emphasis added). Therefore, as noted by the Inventor and as will be appreciated by one of skill in the art, the unexpected, beneficial results exhibited by the thermoplastic composite sheet of claim 1 are “the result

of the differences in the preparation process.” That is, the San Jun Youn Declaration demonstrates the criticality of the process recited by independent claim 1. As such, the combination of Sakai and Hsiao cannot render obvious independent claim 1 or the claims depending therefrom. Application respectfully request withdrawal of the rejections and allowance of the claims.

### **CONCLUSION**

The Applicants respectfully submit that the application, in its present form, is in condition for allowance. If the Examiner has any questions or comments or otherwise feels it would be helpful in expediting the application, the Examiner is encouraged to telephone the undersigned at (972) 731-2288. The Applicants intend this communication to be a complete response to the Office Action mailed April 11, 2011.

The Commissioner is hereby authorized to charge payment of any fee associated with any of the foregoing papers submitted herewith or any fees during the prosecution of the present case to Deposit Account No. 50-1515, Conley Rose, P.C.

Respectfully submitted,

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